THE GENDER AND ENVIRONMENT DEBATE: LESSONS FROM INDIA

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What is women's relationship with the environment? Is it distinct from that of men's? The growing literature on ecofeminism in the West, and especially in the United States, conceptualizes the link between gender and the environment primarily in ideological terms. An intensifying struggle for survival in the developing world, however, highlights the material basis for this link and sets the background for an alternative formulation to ecofeminism, which I term "feminist environmentalism."

In this paper I will argue that women, especially those in poor rural households in India, on the one hand, are victims of environmental degradation in quite gender-specific ways. On the other hand, they have been active agents in movements of environmental protection and regeneration, often bringing to them a gender-specific perspective and one which needs to inform our view of alternatives. To contextualize the discussion, and to examine the opposing dimensions of women as victims and women as actors in concrete terms, this essay will focus on India, although the issues are clearly relevant to other parts of the Third World as well. The discussion is divided into five sections. The first section outlines the ecofeminist debate in the United States and one prominent Indian variant of it, and suggests an alternative conceptualization. The next three sections respectively trace the nature and causes of environmental degradation in rural India, its class and gender implications, and the responses to it by the state and grass-roots groups. The concluding section argues for an alternative transformative approach to development.

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SOME CONCEPTUAL ISSUES

Ecofeminism. Ecofeminism embodies within it several different strands of discourse, most of which have yet to be spelled out fully, and which reflect, among other things, different positions within the Western feminist movement (radical, liberal, socialist). As a body of thought ecofeminism is as yet underdeveloped and still evolving, but carries a growing advocacy. My purpose is not to critique ecofeminist discourse in detail, but rather to focus on some of its major elements, especially in order to examine whether and how it might feed into the formulation of a Third World perspective on gender and the environment. Disentangling the various threads in the debate, and focusing on those more clearly articulated, provides us with the following picture of the ecofeminist argument(s):[1] (1) There are important connections between the domination and oppression of women and the domination and exploitation of nature. (2) In patriarchal thought, women are identified as being closer to nature and men as being closer to culture. Nature is seen as inferior to culture; hence, women are seen as inferior to men. (3) Because the domination of women and the domination of nature have occurred together, women have a particular stake in ending the domination of nature, "in healing the alienated human and non-human nature."[2] (4) The feminist movement and the environmental movement both stand for egalitarian, nonhierarchical systems. They thus have a good deal in common and need to work together to evolve a common perspective, theory, and practice.

In the ecofeminist argument, therefore, the connection between the domination of women and that of nature is basically seen as *ideological*, as rooted in a system of ideas and representations, values and beliefs, that places women and the nonhuman world hierarchically below men. And it calls upon women and men to reconceptualize themselves, and their relationships to one another and to the nonhuman world, in nonhierarchical ways.

We might then ask: In what is this connection between nature and women seen to be rooted? The idea that women are seen as closer to nature than men was initially introduced into contemporary feminist discourse by Sherry Ortner who argued that "woman is being identified with – or, if you will, seems to be a symbol of – something that every culture devalues, defines as being of a lower order of existence than itself. . . . [That something] is 'nature' in the

most generalized sense. . . . [Women are everywhere] being symbolically associated with nature, as opposed to men, who are identified with culture."[3] In her initial formulation, the connection between women and nature was clearly rooted in the biological processes of reproduction although, even then, Ortner did recognize that women, like men, also *mediate* between nature and culture.

Ortner has since modified her position which was also criticized by others (particularly social anthropologists) on several counts, especially because the nature-culture divide is not universal across all cultures, nor is there uniformity in the meaning attributed to "nature," "culture," "male," and "female."[4] Still, some ecofeminists accept the emphasis on biology uncritically and in different ways reiterate it. An extreme form of this position is that taken by Ariel Kay Salleh who grounds even women's consciousness in biology and in nature. She argues: "Women's monthly fertility cycle, the tiring symbiosis of pregnancy, the wrench of childbirth and the pleasure of suckling an infant, these things already ground women's consciousness in the knowledge of being coterminous with nature. However tacit or unconscious this identity may be for many women . . . it is nevertheless 'a fact of life.'"[5] Others such as Ynestra King and Carolyn Merchant argue that the nature-culture dichotomy is a false one, a patriarchal ideological construct which is then used to maintain gender hierarchy. At the same time they accept the view that women are ideologically constructed as closer to nature because of their biology.[6]

Merchant, however, in an illuminating historical analysis, shows that in premodern Europe the conceptual connection between women and nature rested on two divergent images, coexisting simultaneously, one which constrained the destruction of nature and the other which sanctioned it. Both identified nature with the female sex. The first image, which was the dominant one, identified nature, especially the earth, with the nurturing mother, and culturally restricted "the types of socially and morally sanctioned human actions allowable with respect to the earth. One does not readily slay a mother, dig into her entrails for gold, or mutilate her body. . . ."[7] The opposing image was of nature as wild and uncontrollable which could render violence, storms, droughts, and general chaos. This image culturally sanctioned mastery and human dominance over nature.

Between the sixteenth and seventeenth centuries, Merchant sug-

gests, the Scientific Revolution and the growth of a market-oriented culture in Europe undermined the image of an organic cosmos with a living female earth at its center. This image gave way to a mechanistic worldview in which nature was reconceived as something to be mastered and controlled by humans. The twin ideas of mechanism and of dominance over nature supported both the denudation of nature and male dominance over women. Merchant observes:

> The ancient identity of nature as a nurturing mother links women's history with the history of the environment and ecological change. . . . In investigating the roots of our current environmental dilemma and its connections to science, technology, and the economy, we must reexamine the formation of a world view and a science that, by reconceptualizing reality as a machine rather than a living organism, sanctioned the domination of both nature and women.

Today, Merchant proposes, juxtaposing the egalitarian goals of the women's movement and the environmental movement can suggest "new values and social structures, based not on the domination of women and nature as resources but on the full expression of both male and female talent and on the maintenance of environmental integrity."[8]

Ecofeminist discourse, therefore, highlights (a) some of the important conceptual links between the *symbolic* construction of women and nature and the ways of *acting* upon them (although Merchant alone goes beyond the level of assertion to trace these links in concrete terms, historically); (b) the underlying commonality between the premises and goals of the women's movement and the environmental movement; and (c) an alternative vision of a more egalitarian and harmonious future society.

At the same time the ecofeminist argument as constructed is problematic on several counts. First, it posits "woman" as a unitary category and fails to differentiate among women by class, race, ethnicity, and so on. It thus ignores forms of domination other than gender which also impinge critically on women's position.[9] Second, it locates the domination of women and of nature almost solely in ideology, neglecting the (interrelated) material sources of this dominance (based on economic advantage and political power). Third, even in the realm of ideological constructs, it says little (with the exception of Merchant's analysis) about the social, economic, and political structures within which these constructs are produced and transformed. Nor does it address the central

issue of the means by which certain dominant groups (predicated on gender, class, etc.) are able to bring about ideological shifts in their own favor and how such shifts get entrenched. Fourth, the ecofeminist argument does not take into account women's lived material relationship with nature, as opposed to what others or they themselves might conceive that relationship to be. Fifth, those strands of ecofeminism that trace the connection between women and nature to biology may be seen as adhering to a form of essentialism (some notion of a female "essence" which is unchangeable and irreducible).[10] Such a formulation flies in the face of wide-ranging evidence that concepts of nature, culture, gender, and so on, are historically and socially constructed and vary across and within cultures and time periods.[11]

In other words, the debate highlights the significant effect of ideological constructs in shaping relations of gender dominance and forms of acting on the nonhuman world, but if these constructs are to be challenged it is necessary to go further. We need a theoretical understanding of what could be termed "the political economy of ideological construction," that is, of the interplay between conflicting discourses, the groups promoting particular discourses, and the means used to entrench views embodied in those discourses. Equally, it is critical to examine the underlying basis of women's relationship with the nonhuman world at levels other than ideology (such as through the work women and men do and the gender division of property and power) and to address how the material realities in which women of different classes (/castes/ races) are rooted might affect their responses to environmental degradation. Women in the West, for instance, have responded in specific ways to the threat of environmental destruction, such as by organizing the Greenham Commons resistance to nuclear missiles in England and by participating in the Green movement across Europe and the United States. A variety of actions have similarly been taken by women in the Third World, as discussed later. The question then is: Are there *gendered* aspects to these responses? If so, in what are these responses rooted?

Vandana Shiva's work on India takes us a step forward. Like the ecofeminists, she sees violence against nature and against women as built into the very mode of perceiving both. Like Merchant, she argues that violence against nature is intrinsic to the dominant industrial/developmental model, which she characterizes as a co-

lonial imposition. Associated with the adoption of this developmental model, Shiva argues, was a radical conceptual shift away from the traditional Indian cosmological view of (animate and inanimate) nature as Prakriti, as "activity *and* diversity" and as "an expression of Shakti, the feminine and creative principle of the cosmos" which "in conjunction with the masculine principle (Purusha) . . . creates the world." In this shift, the living, nurturing relationship between man and nature as earth mother was replaced by the notion of man as separate from and dominating over inert and passive nature. "Viewed from the perspective of nature, or women embedded in nature," the shift was repressive and violent. "For women . . . the death of Prakriti is simultaneously a beginning of their marginalisation, devaluation, displacement, and ultimate dispensability. The ecological crisis is, at its root, the death of the feminine principle. . . ."[12]

At the same time, Shiva notes that violence against women and against nature are linked not just ideologically but also materially. For instance, Third World women are dependent on nature "for drawing sustenance for themselves, their families, their societies." The destruction of nature thus becomes the destruction of women's sources for "staying alive." Drawing upon her experience of working with women activists in the Chipko movement – the environmental movement for forest protection and regeneration in the Garhwal hills of northwest India – Shiva argues that "Third World women" have both a special dependence on nature and a special knowledge of nature. This knowledge has been systematically marginalized under the impact of modern science: "Modern reductionist science, like development, turns out to be a patriarchal project, which has excluded women as experts, and has simultaneously excluded ecology and holistic ways of knowing which understand and respect nature's processes and interconnectedness as *science*."[13]

Shiva takes us further than the Western ecofeminists in exploring the links between ways of thinking about development, the processes of developmental change, and the impact of these on the environment and on the people dependent upon it for their livelihood. These links are of critical significance. Nevertheless her argument has three principal analytical problems. First, her examples relate to rural women primarily from northwest India, but her generalizations conflate all Third World women into one cate-

gory. Although she distinguishes Third World women from the rest, like the ecofeminists she does not differentiate between women of different classes, castes, races, ecological zones, and so on. Hence, implicitly, a form of essentialism could be read into her work, in that all Third World women, whom she sees as "embedded in nature," *qua women* have a special relationship with the natural environment. This still begs the question: What is the basis of this relationship and how do women acquire this special understanding?

Second, she does not indicate by what concrete processes and institutions ideological constructions of gender and nature have changed in India, nor does she recognize the coexistence of several ideological strands, given India's ethnic and religious diversity. For instance, her emphasis on the feminine principle as the guiding idea in Indian philosophic discourse in fact relates to the Hindu discourse alone and cannot be seen as applicable for Indians of all religious persuasions.[14] Indeed, Hinduism itself is pluralistic, fluid, and contains several coexisting discourses with varying gender implications.[15] But perhaps most importantly, it is not clear how and in which historical period(s) the concept of the feminine principle *in practice* affected gender relations or relations between people and nature.

Third, Shiva attributes existing forms of destruction of nature and the oppression of women (in both symbolic and real terms) principally to the Third World's history of colonialism and to the imposition of Western science and a Western model of development. Undeniably, the colonial experience and the forms that modern development has taken in Third World countries have been destructive and distorting economically, institutionally, and culturally. However, it cannot be ignored that this process impinged on preexisting bases of economic and social (including gender) inequalities.

Here it is important to distinguish between the particular model of modernization that clearly has been imported/adopted from the West by many Third World countries (with or without a history of colonization) and the socioeconomic base on which this model was imposed. Pre-British India, especially during the Mughal period, was considerably class/caste stratified, although varyingly across regions.[16] This would have affected the patterns of access to and use of natural resources by different classes and social groups.

Although much more research is needed on the political economy of natural resource use in the precolonial period, the evidence of differentiated peasant communities at that time cautions against sweeping historical generalizations about the effects of colonial rule.

By locating the "problem" almost entirely in the Third World's experience of the West, Shiva misses out on the very real local forces of power, privilege, and property relations that predate colonialism. What exists today is a complex legacy of colonial and precolonial interactions that defines the constraints and parameters within which and from which present thinking and action on development, resource use, and social change have to proceed. In particular, a strategy for change requires an explicit analysis of the structural causes of environmental degradation, its effects, and responses to it. The outline for an alternative framework, which I term feminist environmentalism, is suggested below.

Feminist Environmentalism. I would like to suggest here that women's and men's relationship with nature needs to be understood as rooted in their material reality, in their specific forms of interaction with the environment. Hence, insofar as there is a gender and class (/caste/race)-based division of labor and distribution of property and power, gender and class (/caste/race) structure people's interactions with nature and so structure the effects of environmental change on people and their responses to it. And where knowledge about nature is experiential in its basis, the divisions of labor, property, and power which shape experience also shape the knowledge based on that experience.

For instance, poor peasant and tribal women have typically been responsible for fetching fuel and fodder and in hill and tribal communities have also often been the main cultivators. They are thus likely to be affected adversely in quite specific ways by environmental degradation. At the same time, in the course of their everyday interactions with nature, they acquire a special knowledge of species varieties and the processes of natural regeneration. (This would include knowledge passed on to them by, for example, their mothers.) They could thus be seen as both victims of the destruction of nature and as repositories of knowledge about nature, in ways distinct from the men of their class. The former aspect would provide the gendered impulse for their resistance and response to environmental destruction. The latter

would condition their perceptions and choices of what should be done. Indeed, on the basis of their experiential understanding and knowledge, they could provide a special perspective on the processes of environmental regeneration, one that needs to inform our view of alternative approaches to development. (By extension, women who are no longer actively using this knowledge for their daily sustenance, and are no longer in contact with the natural environment in the same way, are likely to lose this knowledge over time and with it the possibility of its transmission to others.)

In this conceptualization, therefore, the link between women and the environment can be seen as structured by a given gender and class (/caste/race) organization of production, reproduction, and distribution. Ideological constructions such as of gender, of nature, and of the relationship between the two, may be seen as (interactively) a part of this structuring but not the whole of it. This perspective I term "feminist environmentalism."

In terms of action such a perspective would call for struggles over *both* resources and meanings. It would imply grappling with the dominant groups who have the property, power, and privilege to control resources, and these or other groups who control ways of thinking about them, via educational, media, religious, and legal institutions. On the feminist front there would be a need to challenge and transform both *notions* about gender and the *actual* division of work and resources between the genders. On the environmental front there would be a need to challenge and transform not only notions about the relationship between people and nature but also the actual methods of appropriation of nature's resources by a few. Feminist environmentalism underlines the necessity of addressing these dimensions from both fronts.

To concretize the discussion, consider India's experience in the sections below. The focus throughout is on the rural environment.

ENVIRONMENTAL DEGRADATION AND FORMS OF APPROPRIATION

In India (as in much of Asia and Africa) a wide variety of essential items are gathered by rural households from the village commons and forests for everyday personal use and sale, such as food, fuel, fodder, fiber, small timber, manure, bamboo, medicinal herbs, oils, materials for housebuilding and handicrafts, resin, gum,

honey, and spices.[17] Although all rural households use the village commons in some degree, for the poor they are of critical significance given the skewedness of privatized land distribution in the subcontinent.[18] Data for the early 1980s from twelve semiarid districts in seven Indian states indicate that for poor rural households (the landless and those with less than two hectares dryland equivalent) village commons account for at least 9 percent of total income, and in most cases 20 percent or more, but contribute only 1 to 4 percent of the incomes of the nonpoor (table 1). The dependence of the poor is especially high for fuel and fodder: village commons supply more than 91 percent of firewood and more than 69 percent of their grazing needs, compared with the relative self-

Table 1
Average Annual Income from Village Commons in Selected Districts of India (1982-85)

State[1] and Districts	Per household annual average income from Village Commons			
	Poor Households[2]		Other Households[3]	
	Value (Rs.)	Percent of total household income	Value (Rs.)	Percent of total household income
Andhra Pradesh				
Mahbubnagar	534	17	171	1
Gujarat				
Mehsana	730	16	162	1
Sabarkantha	818	21	208	1
Karnataka				
Mysore	649	20	170	3
Madhya Pradesh				
Mandsaur	685	18	303	1
Raisen	780	26	468	4
Maharashtra				
Akola	447	9	134	1
Aurangabad	584	13	163	1
Sholapur	641	20	235	2
Rajasthan				
Jalore	709	21	387	2
Nagaur	831	23	438	3
Tamil Nadu				
Dharmapuri	738	22	164	2

Source: N.S. Jodha, "Common Property Resources and Rural Poor," *Economic and Political Weekly,* 5 July 1986, 1176.

[1] "State" here refers to administrative divisions within India and is not used in the political economy sense of the word as used in the text.
[2] Landless households and those owning ‹ 2 hectares (ha) dryland equivalent.
[3] Those owning › 2 ha dryland equivalent. 1 ha = 2.47 acres.

sufficiency of the larger landed households. Access to village commons reduces income inequalities in the village between poor and nonpoor households. Also there is a close link between the viability of small farmers' private property resources and their access to the commons for grazing draft as well as milch animals.[19]

Similarly, forests have always been significant sources of livelihood, especially for tribal populations, and have provided the basis of swidden cultivation, hunting, and the gathering of nontimber forest produce. In India, an estimated 30 million or more people in the country depend wholly or substantially on such forest produce for a livelihood.[20] These sources are especially critical during lean agricultural seasons and during drought and famine.[21]

The health of forests, in turn, has an impact on the health of soils (especially in the hills) and the availability of ground and surface water for irrigation and drinking. For a large percentage of rural households, the water for irrigation, drinking, and various domestic uses comes directly from rivers and streams in the hills and plains. Again there are class differences in the nature of their dependency and access. The richer households are better able to tap the (relatively cleaner) groundwater for drinking and irrigation by sinking more and deeper wells and tubewells, but the poor are mainly dependent on surface sources.

However, the availability of the country's natural resources to the poor is being severely eroded by two parallel, and interrelated, trends—first, their growing degradation both in quantity and quality; second, their increasing statization (appropriation by the state) and privatization (appropriation by a minority of individuals), with an associated decline in what was earlier communal. These two trends, both independently and interactively, underlie many of the differential class-gender effects of environmental degradation outlined later. Independently, the former trend is reducing overall availability, and the latter is increasing inequalities in the distribution of what is available. Interactively, an altered distribution in favor of the state and some individuals and away from community control can contribute to environmental degradation insofar as community resource management systems may be more effective in environmental protection and regeneration than are the state or individuals. These two trends I call the primary factors, underlying the class-gender effects of environmental change. Several intermediary factors impinge on these

primary ones the most important of which, in my view, are the following: the erosion of community resource management systems resulting from the shift in "control rights" over natural resources away from community hands,[22] population growth, and technological choices in agriculture and their associated effect on local knowledge systems. These also need to be seen in interactive terms. Consider each in turn.

Forms of Environmental Degradation. Although there is as yet an inadequate data base to indicate the exact extent of environmental degradation in India and its cross-regional variations, available macro-information provides sufficient pointers to warrant considerable concern and possibly alarm. Degradation in India's natural resource base is manifest in disappearing forests, deteriorating soil conditions, and depleting water resources. Satellite data from India reveal that in 1985-87, 19.5 percent of the country's geoarea was forested and declining at an estimated rate of 1.3 million hectares a year.[23] Again, by official estimates, in 1980, 56.6 percent of India's land was suffering from environmental problems, especially water and wind erosion. Unofficial estimates are even higher. In some canal projects, one-half the area that could have been irrigated and cultivated has been lost due to waterlogging,[24] creating what the local people aptly call "wet deserts." The area under periodic floods doubled between 1971 and 1981, and soil fertility is declining due to the excessive use of chemical fertilizers. Similarly, the availabilty of both ground and surface water is falling. Groundwater levels have fallen permanently in several regions, including in northern India with its high water tables, due to the indiscriminate sinking fo tubewells – the leading input in the Green Revolution technology.[25] As a result, many drinking water wells have dried up or otherwise been rendered unusable. In addition, fertilizer and pesticide runoffs into natural water sources have destroyed fish life and polluted water for human use in several areas.[26]

The Process of Statization. In India, both under colonial rule and continuing in the postcolonial period, state control over forests and village commons has grown, with selective access being granted to a favored few. To begin with, several aspects of British colonial policy have had long-lasting effects.[27] First, the British established state monopoly over forests, reserving large tracts for timber extraction. Second, associated with this was a severe curtailment in

the customary rights of local populations to these resources, rights of access being granted only under highly restricted conditions, with a total prohibition on the barter or sale of forest produce by such right holders. At the same time, the forest settlement officer could give considerable concessions to those he chose to so privilege. Third, the colonial state promoted the notion of "scientific" forest management which essentially cloaked the practice of encouraging commercially profitable species, often at the cost of species used by the local population. Fourth, there was virtually indiscriminate forest exploitation by European and Indian private contractors, especially for building railways, ships, and bridges. Tree clearing was also encouraged for establishing tea and coffee plantations and expanding the area under agriculture to increase the government's land revenue base. In effect these policies (a) severely eroded local systems of forest management; (b) legally cut off an important source of sustenance for people, even though illegal entries continued; (c) created a continuing source of tension between the forestry officials and the local people; and (d) oriented forest management to commercial needs.

Postindependence policies show little shift from the colonial view of forests as primarily a source of commercial use and gain. State monopoly over forests has persisted, with all the attendant tensions, as has the practice of scientific forestry in the interests of commercial profit. Restrictions on local people's access to non-timber forest produce have actually increased, and the harassment and exploitation of forest dwellers by the government's forest guards is widespread.[28]

The Process of Privatization. A growing privatization of community resources in individual (essentially male) hands has paralleled the process of statization. Customarily, large parts of village common lands, especially in northwest India, were what could be termed "community-private," that is, they were private insofar as use rights to them were usually limited to members of the community and therefore exclusionary; at the same time they were communal in that such rights were often administered by a group rather than by an individual.[29] Table 2 reveals a decline in village commons ranging between 26 and 63 percentage points across different regions, between 1950 and 1984. This is attributable mainly to state policy acting to benefit selected groups over others, including illegal encroachments by farmers, made legal over time; the auc-

Table 2
Distribution of Privatized Village Commons in Selected Districts of India

State and Districts	VCs as percent of village area, 1982-84	Percent decline in VC area, 1950-84	Percent of land to:		Percent of recipients among:		Per household area owned (ha)			
			Poor	Others	Poor	Others	Poor		Others	
							Before[1]	After[2]	Before	After
Andhra Pradesh										
Mahbubnagar	9	43	50	50	76	24	0.3	0.9	3.0	5.1
Medak	11	45	51	49	59	41	1.0	2.2	3.1	4.6
Gujarat										
Banaskantha	9	49	18	82	38	62	0.8	2.0	5.4	8.8
Mehsana	11	37	20	80	36	64	1.0	1.7	8.0	9.8
Sabarkantha	12	46	28	72	55	45	0.5	1.1	7.0	9.8
Karnataka										
Bidar	12	41	39	61	64	36	1.0	2.0	6.4	9.2
Gulbarga	9	43	43	57	60	40	0.8	2.4	4.5	7.7
Mysore	18	32	44	56	67	33	0.9	1.9	4.1	11.6
Madhya Pradesh										
Mandsaur	22	34	45	55	75	25	1.2	2.5	7.7	12.4
Raisen	23	47	42	58	68	32	1.3	2.2	6.2	9.0
Vidisha	28	32	38	62	48	52	1.3	2.5	4.9	6.8
Maharashtra										
Akola	11	42	39	61	58	42	1.0	1.6	3.1	4.6
Aurangabad	15	30	30	70	42	58	1.1	2.2	6.4	6.3
Sholapur	19	26	42	58	53	47	0.7	2.2	3.4	5.6
Rajasthan										
Jalore	18	37	14	86	37	63	0.3	1.7	7.2	12.5
Jodhpur	16	58	24	76	35	65	0.4	1.3	2.3	3.8
Nagaur	15	63	21	79	41	59	1.3	2.5	2.4	5.2
Tamil Nadu										
Coimbatore	9	47	50	50	75	25	0.8	2.5	3.8	5.8
Dharmapuri	12	52	49	51	55	45	1.0	1.9	4.6	7.5

Source: N.S. Jodha, "Common Property Resources and Rural Poor," *Economic and Political Weekly,* 5 July 1986, 1177-78.

[1] Before the distribution of VC land.
[2] After the distribution of VC land.

tioning of parts of commons by the government to private contractors for commercial exploitation; and government distribution of common land to individuals under various schemes which were, in theory, initiated for benefiting the poor but in practice benefited the well-off farmers.[30] For sixteen of the nineteen districts covered, the share of the poor was less than that of the non-poor (table 2). Hence the poor lost out collectively while gaining little individually.

Similarly, in the tapping of groundwater through tubewells,

there are dramatic inequalities in the distribution of what is effectively an underground commons. Tubewells are concentrated in the hands of the rich and the noted associated fall in water tables has, in many areas, dried up many shallow irrigation and drinking water wells used by the poor. In some regions, they have also depleted soil moisture from land used by poor households.[31]

Now consider the intermediary factors mentioned earlier: the erosion of community management systems, population growth, and choice of agricultural technology and local knowledge systems.

The Erosion of Community Resource Management Systems. The statization and privatization of communal resources have, in turn, systematically undermined traditional institutional arrangements of resource use and management. The documentation on this is growing, but even existing work reveals systems of water management, methods of gathering firewood and fodder, and practices of shifting agriculture which were typically not destructive of nature.[32] Some traditional religious and folk beliefs also (as noted) contributed to the preservation of nature, especially trees or orchards deemed sacred.[33]

Of course, much more empirical documentation is needed on how regionally widespread these traditional systems of management were and the contexts in which they were successful in ensuring community cooperation. However, the basic point is that where traditional community management existed, as it did in many areas, *responsibility for resource management was linked to resource use* via local community institutions. Where control over these resources passed from the hands of the community to those of the state or of individuals, this link was effectively broken.

In turn, the shift from community control and management of common property, to state or individual ownership and control, has increased environmental degradation.[34] As Daniel W. Bromley and Michael M. Cernea note "the *appearance* of environmental management created through the establishment of government agencies, and the aura of coherent policy by issuance of decrees prohibiting entry to – and harvesting from – State property, has led to continued degradation of resources under the tolerant eye of government agencies."[35]

Property rights vested in individuals are also no guarantee for environmental regeneration. Indeed, as will be discussed at greater length later, individual farmers attempting tree planting for

short-term profits have tended to plant quick-growing commercial trees such as eucalyptus, which can prove environmentally costly.

Population Growth. Excessive population growth has often been identified as the primary culprit of environmental degradation. And undoubtedly, a rapidly growing population impinging over time on a limited land/water/forest base is likely to degrade the environment. However, political economy dimensions clearly underlie the *pace* at which this process occurs and *how the costs of it are distributed.* The continuing (legal and illegal) exploitation of forests, and the increasing appropriation of village commons and groundwater resources by a few, leave the vast majority to subsist on a shrinking natural resource base. Added to this is the noted erosion of community resource management systems which had enforced limitations on what people could and did take from communal resources, and which could perhaps have ensured their protection, despite population pressure.[36]

Population growth can thus be seen as exacerbating a given situation but not necessarily as its primary cause. It is questionable that interventions to control population growth can, in themselves, stem environmental degradation, although clearly, as Paul Shaw argues, they can "buy crucial time until we figure out how to dismantle more ultimate causes."[37]

What adds complexity to even this possibility is that in the link between environmental degradation and population growth, the causality can also run in the opposite direction. For instance, poverty associated with environmental degradation could induce a range of fertility-increasing responses—reduced education for young girls as they devote more time to collecting fuel, fodder, and so on, leading to higher fertility in the long term, given the negative correlation between female education and fertility; higher infant mortality rates inducing higher fertility to ensure a given completed family size; and people having more children to enable the family to diversify incomes as a risk-reducing mechanism in environmentally high-risk areas.[38] These links are another reminder that it is critical to focus on women's status when formulating policies for environmental protection.

Choice of Agricultural Technology and Erosion of Local Knowledge Systems. Many of the noted forms of environmental degradation are associated with the Green Revolution technology adopted to increase crop output. Although dramatically successful in the lat-

ter objective in the short run, it has had high environmental costs, such as falling water tables due to tubewells, waterlogged and saline soils from most large irrigation schemes, declining soil fertility with excessive chemical fertilizer use, and water pollution with pesticides. Moreover, the long-term sustainability of the output increases achieved so far, itself appears doubtful. Deteriorating soil and water conditions are already being reflected in declining crop yields.[39] Genetic variety has also shrunk, and many of the indigenously developed crop varieties (long-tested and adapted to local conditions) have been replaced by improved seeds which are more susceptible to pest attacks. The long-term annual growth rate of agricultural production in India over 1968-85 was 2.6 percent, that is, slightly *lower* than the pre-Green Revolution, 1950-65, rate of 3.08. Crop yields are also more unstable.[40] All this raises questions about the long-term sustainability of agricultural growth, and more generally of rural production systems, under present forms of technology and resource management in India, and indeed in south Asia.

The choice of agricultural technology and production systems cannot be separated from the dominant view of what constitutes scientific agriculture. The Green Revolution embodies a technological mix which gives primacy to laboratory-based research and manufactured inputs and treats agriculture as an isolated production system. Indeed, indiscriminate agricultural expansion, with little attempt to maintain a balance between forests, fields, and grazing lands, assumes that the relationship between agriculture, forests, and village commons is an antagonistic, rather than a complementary, one. By contrast, organic farming systems (now rapidly being eclipsed) are dependent on maintaining just such a balance. More generally, over the years, there has been a systematic devaluation and marginalization of indigenous knowledge about species varieties, nature's processes (how forests, soils, and water are formed and sustained interrelatedly), and sustainable forms of interaction between people and nature. These trends are not confined to countries operating within the capitalist mode. Similar problems of deforestation, desertification, salination, recurrent secondary pest attacks on crops, and pesticide contamination are emerging in China.[41]

What is at issue here is not modern science in itself but the process by which what is regarded as "scientific knowledge" is gen-

erated and applied and how the fruits of that application are distributed. Within the hierarchy of knowledge, that acquired via traditional forms of interacting with nature tends to be deemed less valuable.[42] And the people who use this knowledge in their daily lives—farmers and forest dwellers and especially women of these communities—tend to be excluded from the institutions which create what is seen as scientific knowledge. These boundaries are not inevitable. In Meiji Japan, the farmer's knowledge and innovative skills were incorporated in the broader body of scientific knowledge by a systematized interaction between the farmer, the village extension worker, and the scientist. This enabled a two-way flow of information from the farmer to the scientist and vice-versa: "Intimate knowledge of the best of traditional farming methods was thus the starting point for agricultural research and extension activities.[43]

Such attempts contrast sharply with the more typical top-down flow of information from those deemed experts (the scientists/professionals) to those deemed ignorant (the village users). The problem here is only partly one of class differences. Underlying the divide between the scientists/professionals (usually urban-based) and the rural users of innovations (including user-innovators) whose knowledge comes more from field experience than from formal education, are also usually the divides between intellectual and physical labor, between city and countryside, and between women and men.

CLASS-GENDER EFFECTS

We come then to the class-gender effects of the processes of degradation, statization and privatization of nature's resources, and the erosion of traditional systems of knowledge and resource management. These processes have had particularly adverse effects on poor households because of the noted greater dependency of such households on communal resources. However, focusing on the class significance of communal resources provides only a partial picture—there is also a critical gender dimension, for women and female children are the ones most adversely affected by environmental degradation. The reasons for this are primarily threefold. First, there is a preexisting gender division of labor. It is women in poor peasant and tribal households who do much of the

gathering and fetching from the forests, village commons, rivers, and wells. In addition, women of such households are burdened with a significant responsibility for family subsistence and they are often the primary, and in many female-headed households the sole, economic providers.

Second, there are systematic gender differences in the distribution of subsistence resources (including food and health care) within rural households, as revealed by a range of indicators: anthropometric indices, morbidity and mortality rates, hospital admissions data, and the sex ratio (which is 93 females per 100 males for all-India).[44] These differences, especially in health care, are widespread in India (and indeed in south Asia).[45]

Third, there are significant inequalities in women's and men's access to the most critical productive resource in rural economies, agricultural land, and associated production technology.[46] Women also have a systematically disadvantaged position in the labor market. They have fewer employment opportunities, less occupational mobility, lower levels of training, and lower payments for same or similar work.[47] Due to the greater task specificity of their work, they also face much greater seasonal fluctuations in employment and earnings than do men, with sharper peaks and longer slack periods in many regions and less chance of finding employment in the slack seasons.[48]

Given their limited rights in private property resources such as agricultural land, rights to communal resources such as the village commons have always provided rural women and children (especially those of tribal, landless, or marginal peasant households) a source of subsistence, *unmediated by dependency relationships* on adult males. For instance, access to village commons is usually linked to membership in the village community and therefore women are not excluded in the way they may be in a system of individualized private land rights. This acquires additional importance in regions with strong norms of female seclusion (as in northwest India) where women's access to the cash economy, to markets, and to the marketplace itself is constrained and dependent on the mediation of male relatives.[49]

It is against this analytical backdrop that we need to examine what I term the "class-gender effects" (the gender effects mediated by class) of the processes of environmental degradation, statization and privatization. These effects relate to at least six critical aspects:

time, income, nutrition, health, social-survival-networks, and indigenous knowledge. Each of these effects is important across rural India. However, their intensity and interlinkages would differ cross-regionally, with variations in ecology, agricultural technology, land distribution, and social structures, associated with which are variations in the gender division of labor, social relations, livelihood possibilities, and kinship systems.[50] Although a systematic regional decomposition of effects is not attempted below, all the illustrative examples are regionally contextualized.

On Time. Because women are the main gatherers of fuel, fodder, and water, it is primarily their working day (already averaging ten to twelve hours) that is lengthened with the depletion of and reduced access to forests, waters, and soils. Firewood, for instance, is the single most important source of domestic energy in India (providing more than 65 percent of domestic energy in the hills and deserts of the north). Much of this is gathered and not purchased, especially by the poor. In recent years, there has been a severalfold increase in firewood collection time (see table 3). In some villages of Gujarat, in western India, even a four-to-five-hour search yields little apart from shrubs, weeds, and tree roots which do not provide adequate heat.

Similarly, fodder collection takes longer with a decline in the village commons. As a woman in the hills of Uttar Pradesh (northwest India) puts it:

> When we were young, we used to go to the forest early in the morning without eating anything. There we would eat plenty of berries and wild fruits . . . drink the cold sweet [water] of the *Banj* [oak] roots. . . . In a short while we would gather all the fodder and firewood we needed, rest under the shade of some huge tree and then go home. Now, with the going of the trees, everything else has gone too.[51]

The shortage of drinking water has exacerbated the burden of time and energy on women and young girls. Where low-caste women often have access to only one well, its drying up could mean an endless wait for their vessels to be filled by upper-caste women, as was noted to have happened in Orissa.[52] A similar problem arises when drinking water wells go saline near irrigation works.[53]

In Uttar Pradesh, according to a woman grassroots activist, the growing hardship of young women's lives with ecological degradation has led to an increased number of suicides among them in re-

Table 3
Time Taken and Distance Travelled for Firewood Collection

Country/Region	Year of Data	Firewood collection*		Data Source
		Time taken	Distance travelled	
India				
Chamoli (hills)				
(a) Dwing	}1982	5 hr/day@	over 5 km	}Swaminathan
(b) Pakhi	}	4 hr/day		}(1984)
Gujarat (plains)				
(a) Forested	}	once every 4 days	n.a.	}
(b) Depleted	}1980	once every 2 days	4-5 km	}Nagbrahman &
(c) Severely depleted	}	4-5 hr/day	n.a.	}Sambrani (1983)
Madhya Pradesh (plains)	1980	1-2 times/week	5 km	Chand & Bezboruah (1980)
Kumaon (hills)	1982	3 days/week	5-7 km	Folger & Dewan (1983)
Karnataka (plains)	n.a.	1 hr/day	5.4 km/trip	Batliwala (1983)
Garhwal (hills)	n.a.	5 hr/day	10 km	Agarwal (1983)
Bihar (plains)	c. 1972	n.a.	1-2 km/day	}Bhaduri & Surin (1980)
	1980	n.a.	8-10 km/day	}
Rajasthan (plains)	1988	5 hr/day (winter)	4 km	personal observation
Nepal				
Tinan (hills)	1978	3 hr/day	n.a.	Stone (1982)
Pangua (hills)	late 1970s	4-5 hr/bundle	n.a.	Bajracharya (1983)
WDA** (lowlands)				
(a) low deforestation	} 1982-83	1.5 hr/day	n.a.	}Kumar & Hotchkiss (1988)
(b) high deforestation	}	3 hr/day	n.a.	}

Sources: Madhura Swaminathan, "Eight Hours a Day for Fuel Collection," *Manushi* (March-April 1984); D. Nagbrahman and S. Sambrani, "Women's Drudgery in Firewood Collection," *Economic and Political Weekly,* 1-8 Jan. 1983; Malini Chand and Rita Bezboruah, "Employment Opportunities for Women in Forestry" in *Community Forestry and People's Participation, Seminar Report,* Ranchi Consortium for Community Forestry, 20-22 Nov. 1980; Bonnie Folger and Meera Dewan, "Kumaon Hills Reclamation: End of Year Site Visit," (Delhi, OXFAM America, 1983); Srilata Batliwala, "Women and Cooking Energy," *Economic and Political Weekly,* 24-31 Dec. 1983; Anil Agarwal, "The Cooking Energy Systems – Problems and Opportunities," (Center for Science and Environment, Delhi); T. Bhadhuri and V. Surin, "Community Forestry and Women Headloaders," in *Community Forestry and People's Participation, Seminar Report;* Linda Stone, "Women and Natural Resources: Perspectives from Nepal," in *Women in Natural Resources: An International Perspective,* ed. Molly Stock, Jo Ellen Force, and Dixie Ehrenreich (Moscow: University of Idaho Press, 1982); Deepak Bajracharya, "Deforestation in the Food/Fuel Context: Historical and Political Perspectives from Nepal," *Mountain Research and Development* 3, no. 3 (1983); Shubh Kumar and David Hotchkiss, "Consequences of Deforestation for Women's Time Allocation, Agricultural Production, and Nutrition in Hill Areas of Nepal," *Research Report,* no. 69 (Washington, D.C.: International Food Policy Research Institute, 1988).

* Firewood collected mainly by women and children.
@ Average computed from information given in the study.
n.a. Information not available.
** Western Development Area.

cent years. Their inability to obtain adequate quantities of water, fodder, and fuel causes tensions with their mothers-in-law (in whose youth forests were plentiful), and soil erosion has compounded the difficulty of producing enough grain for subsistence in a region of high male outmigration.[54]

On Income. The decline in gathered items from forests and village commons has reduced incomes directly. In addition, the extra time needed for gathering reduces time available to women for crop production and can adversely affect crop incomes, especially in hill communities where women are the primary cultivators due to high male outmigration. For instance, a recent study in Nepal found that the substantial increase in firewood collection time due to deforestation has significantly reduced women's crop cultivation time, leading to an associated fall in the production of maize, wheat, and mustard which are primarily dependent on female labor in the region. These are all crops grown in the dry season when there is increased need for collecting fuel and other items.[55] The same is likely to be happening in the hills of India.

Similar implications for women's income arise with the decline in common grazing land and associated fodder shortage. Many landless widows I spoke to in Rajasthan (northwest India) in 1988 said they could not venture to apply for a loan to purchase a buffalo under the government's anti-poverty program as they had nowhere to graze the animal and no cash to buy fodder.

As other sources of livelihood are eroded, selling firewood is becoming increasingly common, especially in eastern and central India. Most "headloaders," as they are called, are women, earning a meager 5.50 rupees a day for twenty kilograms of wood.[56] Deforestation directly impinges on this source of livelihood as well.

On Nutrition. As the area and productivity of village commons and forests fall, so does the contribution of gathered food in the diets of poor households. The declining availability of fuelwood has additional nutritional effects. Efforts to economize induce people to shift to less nutritious foods which need less fuel to cook or which can be eaten raw, or force them to eat partially cooked food which could be toxic, or eat leftovers that could rot in a tropical climate, or to miss meals altogether. Although as yet there are no systematic studies on India, some studies on rural Bangladesh are strongly indicative and show that the total number of meals eaten daily as well as the number of cooked meals eaten in poor house-

holds is already declining.[57] The fact that malnutrition can be caused as much by shortages of fuel as of food has long been part of the conventional wisdom of rural women who observe: "It's not what's in the pot that worries you, but what's under it." A tradeoff between the time spent in fuel gathering versus cooking can also adversely affect the meal's nutritional quality.

Although these adverse nutritional effects impinge on the whole household, women and female children bear an additional burden because of the noted gender biases in intrafamily distribution of food and health care. There is also little likelihood of poor women being able to afford the extra calories for the additional energy expended in fuel collection.

On Health. Apart from the health consequences of nutritional inadequacies, poor rural women are also more directly exposed than are men to waterborne diseases and to the pollution of rivers and ponds with fertilizer and pesticide runoffs, because of the nature of the tasks they perform, such as fetching water for various domestic uses and animal care, and washing clothes near ponds, canals, and streams.[58] The burden of family ill-health associated with water pollution also falls largely on women who take care of the sick. An additional source of vulnerability is the agricultural tasks women perform. For instance, rice transplanting, which is usually a woman's task in most parts of Asia, is associated with a range of diseases, including arthritis and gynecological ailments.[59] Cottonpicking and other tasks done mainly by women in cotton cultivation expose them to pesticides which are widely used for this crop. In China, several times the acceptable levels of DDT and BHC residues have been found in the milk of nursing mothers, among women agricultural workers.[60] In India, pesticides are associated with limb and visual disabilities.[61]

On Social Support Networks. The considerable displacement of people that results from the submersion of villages in the building of major irrigation and hydroelectric works, or from large-scale deforestation in itself, has another (little recognized) class and gender implication – the disruption of social support networks. Social relationships with kin, and with villagers outside the kin network, provide economic and social support that is important to all rural households but especially to poor households and to the women.[62] This includes reciprocal labor-sharing arrangements during peak agricultural seasons; loans taken in cash or kind dur-

ing severe crises such as droughts; and the borrowing of small amounts of food stuffs, fuel, fodder, and so on, even in normal times. Women typically depend a great deal on such informal support networks, which they also help to build through daily social interaction, marriage alliances that they are frequently instrumental in arranging, and complex gift exchanges.[63] Also the social and economic support this represents for women in terms of strengthening their bargaining power within families needs to be recognized, even if it is not easy to quantify.[64] These networks, spread over a range of nearby villages, cannot be reconstituted easily, an aspect ignored by rehabilitation planners.

Moreover for forest dwellers, the relationship with forests is not just functional or economic but also symbolic, suffused with cultural meanings and nuances, and woven into their songs and legends of origin. Large-scale deforestation, whether or not due to irrigation schemes, has eroded a whole way of living and thinking. Two close observers of life among the tribal people of Orissa in eastern India note that "the earlier sense of sharing has disappeared. . . . Earlier women would rely on their neighbors in times of need. Today this has been replaced with a sense of alienation and helplessness . . . the trend is to leave each family to its own fate."[65] Widows and the aged are the most neglected.

On Women's Indigenous Knowledge. The gathering of food alone demands an elaborate knowledge of the nutritional and medicinal properties of plants, roots, and trees, including a wide reserve knowledge of edible plants not normally used but critical for coping with prolonged shortages during climatic disasters. An examination of household coping mechanisms during drought and famine reveals a significant dependence on famine foods gathered mainly by women and children for survival. Also among hill communities it is usually women who do the seed selection work and have the most detailed knowledge about crop varieties.[66] This knowledge about nature and agriculture, acquired by poor rural women in the process of their everyday contact with and dependence on nature's resources, has a class and gender specificity and is linked to the class specificity and gendering of the division of labor.

The impact of existing forms of development on this knowledge has been twofold. First, the process of devaluation and marginalization of indigenous knowledge and skills, discussed earlier, impinges especially on the knowledge that poor peasant and tribal

women usually possess. Existing development strategies have made little attempt to tap or enhance this knowledge and understanding. At the same time, women have been excluded from the institutions through which modern scientific knowledge is created and transmitted. Second, the degradation of natural resources and their appropriation by a minority results in the destruction of the material basis on which women's knowledge of natural resources and processes is founded and kept alive, leading to its gradual eclipse.

RESPONSES: STATE AND GRASSROOTS

Both the state and the people most immediately affected by environmental degradation have responded to these processes, but in different ways. The state's recognition that environmental degradation may be acquiring crisis proportions is recent and as yet partial; and, as we have seen, state developmental policies are themselves a significant cause of the crisis. Not surprisingly, therefore, the state's response has been piecemeal rather than comprehensive. For instance, the problem of deforestation and fuelwood shortage has been addressed mainly by initiating tree-planting schemes either directly or by encouraging village communities and individual farmers to do so.

However, most state ventures[67] in the form of direct planting have had high failure rates in terms of both tree planting and survival, attributable to several causes—a preoccupation with monocultural plantations principally for commercial use, which at times have even replaced mixed forests; the takeover of land used for various other purposes by the local population; and top-down implementation. Hence, in many cases, far from benefiting the poor these schemes have taken away even existing rights and resources, leading to widespread local resistance. Also, women either do not feature at all in such schemes or, at best, tend to be allotted the role of caretakers in tree nurseries, with little say in the choice of species or in any other aspect of the project. Community forestry schemes, on the other hand, are often obstructed by economic inequalities in the village community and the associated mistrust among the poor of a system that cannot ensure equitable access to the products of the trees planted.

Ironically, the real "success" stories, with plantings far exceeding

targets, relate to the better-off farmers who, in many regions, have sought to reap quick profits by allotting fertile cropland to commercial trees. As a result, employment, crop output, and crop residues for fuel have declined, often dramatically, and the trees planted, such as eucalyptus, provide no fodder and poor fuel.[68] The recent government policy in West Bengal (eastern India) of leasing sections of degraded forest land to local communities for collectively planting, managing, and monitoring tree plantations for local use, holds promise. But in several other parts of the country large tracts of such land have also been given to paper manufacturers for planting commercial species.

As some environmentalists have rightly argued, this predominantly commercial approach to forestry, promoted as "scientific forestry," is reductionist—it is nature seen as individual parts rather than as an interconnected system of vegetation, soil, and water; the forest is reduced to trees, the trees to biomass. For instance, Shiva notes that in the reductionist worldview only those properties of a resource system are taken into account which generate profits, whereas those that stabilize ecological processes, but are commercially nonexploitable, are ignored and eventually destroyed.[69]

Indeed, the noted effects of development policies on the environment—be they policies relating to agriculture or more directly to forests and water use—point to a strategy which has been extractive/destructive of nature rather than conserving/regenerative. The strategy does not explicitly take account of the long-term complementarity between agriculture and natural resource preservation and therefore raises serious questions about the ability of the system both to sustain long-term increases in agricultural productivity and to provide sustenance for the people.

But should we see people in general and women in particular solely as victims of environmental degradation and of ill-conceived top-down state policies? The emergence of grassroots ecology movements across the subcontinent (and especially India) suggests otherwise. These movements indicate that although poor peasant and tribal communities in general, and women among them in particular, are being severely affected by environmental degradation and appropriation, they are today also critical agents of change. Further, embodied in their traditional interaction with the environment are practices and perspectives which can prove

important for defining alternatives.

The past decade, in particular, has seen an increasing resistance to ecological destruction in India, whether caused by direct deforestation (which is being resisted through nonviolent movements such as Chipko in the Himalayan foothills and Appiko in Karnataka) or by large irrigation and hydroelectric works, such as the Narmada Valley Project covering three regions in central India, the Koel-Karo in Bihar, the Silent Valley Project in Kerala (which was shelved through central government intervention and local protests in 1983), the Inchampalli and Bhopalpatnam dams in Andhra Pradesh (against which 5,000 tribal people, with women in the vanguard, protested in 1984), and the controversial Tehri dam in Garwal. Women have been active participants in most of these protests.

Although fueled by differing ideological streams, which Ramachandra Guha identifies as Crusading Gandhian, Appropriate Technology, and Ecological Marxism, these resistance movements suggest that those affected can also be critical agents of change. Common to these streams is the recognition that the present model of development has not succeeded either in providing sustenance or in ensuring sustainability. However, the points from which the differing ideologies initiate this critique are widely dispersed. In particular, they differ in their attitudes to modern science and to socioeconomic inequalities. As Guha puts it, under the crusading Gandhian approach, "modern science is seen as responsible for industrial society's worst excesses,"[70] and socioeconomic inequalities within village communities tend to get glossed over. Ecological Marxism sees modern science and the "scientific temper" as indispensable for constructing a new social order, and there is a clear recognition of and attack on class and caste inequalities (although the position on gender is ambiguous). Appropriate Technology thinking, which falls within these two strands, is not as well-worked-out a philosophic and theoretical position as Gandhism and Marxism. It is pragmatic in its approach to modern science and emphasizes the need to synthesize traditional and modern technological traditions. Although problems relating to socioeconomic hierarchies are recognized, there is no clear program for tackling them. Over the past decade there has been some cross-fertilization of thinking across these different ideological streams.

However, it is important to distinguish here between the perspectives revealed by an examination of *practice* within the environmental movement and the explicit *theoretical* formulation of an environmental perspective. Although dialectically interlinked the two do not entirely overlap. The three ideological streams, as identified by Guha, relate to different ways in which groups adhering to preexisting ideological and philosophic positions (Marxist, Gandhian) have incorporated environmental concerns in their practice. In a sense environment has been added on to their other concerns by these groups. This does not as yet represent the formulation of a new theoretical perspective (that an environmental approach to development needs) by any of these groups.

In terms of practice within the movement, women have been a visible part of most rural grassroots ecological initiatives (as they have of peasant movements in general). This visibility is most apparent in the Chipko movement described below. However, women's participation in a movement does not *in itself* represent an explicit incorporation of a gender perspective, in either theory or practice, within that movement. Yet such a formulation is clearly needed. Feminist environmentalism as spelled out earlier in this paper is an attempt in this direction.

To restate in this context, in feminist environmentalism I have sought to provide a theoretical perspective that locates both the symbolic and material links between people and the environment in their specific forms of interaction with it, and traces gender and class differentiation in these links to a given gender and class division of labor, property, and power. Unlike Gandhism and Marxism, feminist environmentalism is not a perspective that is consciously subscribed to by an identifiable set of individuals or groups. However, insofar as tribal and poor peasant women's special concern with environmental degradation is rooted in this material reality, their responses to it, which have been articulated both in complementary and oppositional terms to the other ideological streams, could be seen as consistent with the feminist environmentalist framework.

The Chipko movement is an interesting example in this respect. Although it emerged from the Gandhian tradition, in the course of its growth it has brought to light some of the limitations of an approach that does not explicitly take account of class and gender concerns. More generally too it is a movement of considerable his-

torical significance whose importance goes beyond locational specificity, and is a noteworthy expression of hill women's specific understanding of forest protection and environmental regeneration.[71]

The movement was sparked off in 1972-73 when the people of Chamoli district in northwest India protested the auctioning of 300 ash trees to a sports good manufacturer, while the local labor cooperative was refused permission by the government to cut even a few trees to make agricultural implements for the community. Since then the movement has spread not only within the region but its methods and message have also reached other parts of the country (Appiko in Karnataka is an offshoot).[72] Further, the context of local resistance has widened. Tree felling is being resisted also to prevent disasters such as landslides, and there has been protest against limestone mining in the hills for which the villagers had to face violence from contractors and their hired thugs.

Women's active involvement in the Chipko movement has several noteworthy features that need highlighting here. First, their protest against the commercial exploitation of the Himalayan forests has been not only jointly with the men of their community when they were confronting nonlocal contractors but also, in several subsequent instances, even in opposition to village men due to differences in priorities about resource use. Time and again, women have clear-sightedly opted for saving forests and the environment over the short-term gains of development projects with high environmental costs. In one instance, a potato-seed farm was to be established by cutting down a tract of oak forest in Dongri Paintoli village. The men supported the scheme because it would bring in cash income. The women protested because it would take away their only local source of fuel and fodder and add five kilometers to their fuel-collecting journeys, but cash in the men's hands would not necessarily benefit them or their children.[73] The protest was successful.

Second, women have been active and frequently successful in protecting the trees, stopping tree auctions, and keeping a vigil against illegal felling. In Gopeshwar town, a local women's group has appointed watchwomen who receive a wage in kind to guard the surrounding forest, and to regulate the extraction of forest produce by villagers. Twigs can be collected freely, but any harm to the trees is liable to punishment.

Third, replanting is a significant component of the movement.

But in their choice of trees the priorities of women and men don't always coincide—women typically prefer trees that provide fuel, fodder, and daily needs, the men prefer commercially profitable ones.[74] Once again this points to the association between gendered responsibility for providing a family's subsistence needs and gendered responses to threats against the resources that fulfill those needs.

Fourth, Chipko today is more than an ecology movement and has the potential for becoming a wider movement against gender-related inequalities. For instance, there has been large-scale mobilization against male alcoholism and associated domestic violence and wasteful expenditure. There is also a shift in self-perception. I have seen women stand up in public meetings of the movement and forcefully address the gathering. Many of them are also asking: Why aren't we members of the village councils?

Fifth, implicit in the movement is a holistic understanding of the environment in general and forests in particular. The women, for instance, have constructed a poetic dialogue illustrating the difference between their own perspective and that of the foresters.[75]

Foresters: What do the forests bear?
Profits, resin and timber.

Women (Chorus): What do the forests bear?
Soil, water and pure air.
Soil, water and pure air,
Sustain the earth and all she bears.

In other words, the women recognize that forests cannot be reduced merely to trees and the trees to wood for commercial use, that vegetation, soil, and water form part of a complex and interrelated ecosystem. This recognition of the interrelatedness and interdependence between the various material components of nature, and between nature and human sustenance, is critical for evolving a strategy of sustainable environmental protection and regeneration.

Although the movement draws upon, indeed is rooted in, the region's Gandhian tradition which predates Chipko, women's responses go beyond the framework of that tradition and come close to feminist environmentalism in their perspective. This is suggested by their beginning to confront gender and class issues in a number of small but significant ways. For instance, gender

relations are called into question in their taking oppositional stands to the village men on several occasions, in asking to be members of village councils, and in resisting male alcoholism and domestic violence. Similarly, there is clearly a class confrontation involved in their resistance (together with the men of their community) to the contractors holding licenses for mining and felling in the area.

At the same time, ecology movements such as Chipko need to be contextualized. Although localized resistance to the processes of natural resource appropriation and degradation in India has taken many different forms, and arisen in diverse regional contexts, resistances in which entire communities and villages have participated to constitute a movement (such as Chipko, Appiko, and Jharkhand) have emerged primarily in hill or tribal communities. This may be attributable particularly to two factors: the immediacy of the threat from these processes to people's survival, and these communities being marked by relatively low levels of the class and social differentiation that usually splinter village communities in south Asia. They therefore have a greater potential for wider community participation than is possible in more economically and socially stratified contexts. Further, in these communities, women's role in agricultural production has always been visibly substantial and often primary – an aspect more conducive to their public participation than in many other communities of northern India practicing female seclusion.

In emphasizing the role of poor peasant and tribal women in ecology movements, I am not arguing, as do some feminist scholars, that women possess a specifically feminine sensibility or cognitive temperament, or that women *qua women* have certain traits that predispose them to attend to particulars, to be interactive rather than individualist, and to understand the true character of complex natural processes in holistic terms.[76] Rather, I locate the perspectives and responses of poor peasant and tribal women (perspectives which are indeed often interactive and holistic) in their material reality – in their dependence on and actual use of natural resources for survival, the knowledge of nature gained in that process, and the broader cultural parameters which define people's activities and modes of thinking in these communities. By this count, the perspectives and responses of men belonging to hill or tribal communities would also be more conducive to environ-

mental protection and regeneration than those of men elsewhere, but not more than those of the women of such communities. This is because hill and tribal women, perhaps more than any other group, still maintain a reciprocal link with nature's resources—a link that stems from a given organization of production, reproduction, and distribution, including a given gender division of labor.

At the same time, the positive aspects of this link should not serve as an argument for the continued entrenchment of women within a given division of labor. Rather, they should serve as an argument for creating the conditions that would help universalize this link with nature, for instance, by *declassing* and *degendering* the ways in which productive and reproductive activities are organized (within and outside the home) and how property, resources, knowledge, and power are distributed.

CONCLUSION

The Indian experience offers several insights and lessons. First, the processes of environmental degradation and appropriation of natural resources by a few have specific class-gender as well as locational implications—it is women of poor, rural households who are most adversely affected and who have participated actively in ecology movements. "Women" therefore cannot be posited (as the ecofeminist discourse has typically done) as a unitary category, even within a country, let alone across the Third World or globally. Second, the adverse class-gender effects of these processes are manifest in the erosion of both the livelihood systems and the knowledge systems on which poor rural women depend. Third, the nature and impact of these processes are rooted interactively, on the one hand, in ideology—(in notions about development, scientific knowledge, the appropriate gender division of labor, and so on) and, on the other hand, in the economic advantage and political power predicated especially, but by no means only, on property differentials between households and between women and men. Fourth, there is a spreading grassroots resistance to such inequality and environmental destruction—to the processes, products, people, property, power, and profit-orientation that underlie them. Although the voices of this resistance are yet scattered and localized, their message is a vital one, even from a purely growth and productivity concern and more so if our con-

cern is with people's sustenance and survival.

In particular, the experiences of women's initiatives within the environmental movements suggests that women's militancy is much more closely linked to family survival issues than is men's. Implicit in these struggles is the attempt to carve out a space for an alternative existence that is based on equality, not dominance over people, and on cooperation with and not dominance over nature.

Indeed what is (implicitly or explicitly) being called into question in various ways by the movements is the existing development paradigm – with its particular product and technological mix, its forms of exploitation of natural and human resources, and its conceptualizaton of relationships among people and between people and nature. However, a mere recognition that there are deep inequalities and destructiveness inherent in present processes of development is not enough. There is a need for policy to shift away from its present relief-oriented approach toward nature's ills and people's welfare in which the solution to nutrient-depleted soils is seen to lie entirely in externally added chemical nutrients, to depleting forests in monoculture plantations, to drought starvation in food-for-work programs, to gender inequalities in ad hoc income-generating schemes for women, and so on. These solutions reflect an aspirin approach to development – they are neither curative nor preventive, they merely suppress the symptoms for a while.

The realistic posing of an alternative (quite apart from its implementation) is of course not easy, nor is it the purpose of this paper to provide a blueprint. What is clear so far are the broad contours. An alternative approach, suggested by feminist environmentalism, needs to be *transformational* rather than welfarist – where development, redistribution, and ecology link in mutually regenerative ways. This would necessitate complex and interrelated changes such as in the *composition* of what is produced, the *technologies* used to produce it, the *processes* by which decisions on products and technologies are arrived at, the *knowledge systems* on which such choices are based, and the class and gender *distribution* of products and tasks.

For instance, in the context of forestry programs, a different composition of the product may imply a shift from the currently favored monocultural and commercial tree species to mixed species critical for local subsistence. An alternative agricultural tech-

nology may entail shifting from mainly chemical-based farming to more organic methods, from monocultural high-yielding variety seeds to mixed cropping with indigenously produced varieties, from the emphasis on large irrigation schemes to a plurality of water-provisioning systems, and from a preoccupation with irrigated crops to a greater focus on dryland crops. A change in decision-making processes would imply a shift from the present top-down approach to one that ensures the broad-based democratic participation of disadvantaged groups. Indeed, insofar as the success stories of reforestation today relate to localized communities taking charge of their environmental base, a viable solution would need decentralized planning and control and institutional arrangements that ensure the involvement of the rural poor, and especially women, in decisions about what trees are planted and how the associated benefits are shared. Similarly, to encourage the continued use and growth of local knowledge about plants and species in the process of environmental regeneration, we would require new forms of interaction between local people and trained scientists and a widening of the definition of "scientific" to include plural sources of knowledge and innovations, rather than merely those generated in universities and laboratories. This last is not without precedent, as is apparent from the earlier discussion on Meiji Japan's interactive teams which allowed a flow of information not only from the agricultural scientist to the farmer but also the reverse. The most complex, difficult, and necessary to transform is of course the class and gender division of labor and resources and the associated social relations. Here it is the emergence of new social movements in India around issues of gender, environment, and democratic rights, and especially the formation of joint fronts between these movements on a number of recent occasions, that point the direction for change and provide the points of hope.

Indeed, environmental and gender concerns taken together open up both the need for reexamining, and the possibility of throwing new light on, many long-standing issues relating to development, redistribution, and institutional change. That these concerns preclude easy policy solutions underlines the deep entrenchment (both ideological and material) of interests in existing structures and models of development. It also underlines the critical importance of grassroots political organization of the poor and

of women as a necessary condition for their voices to be heeded and for the entrenched interests to be undermined. Most of all it stresses the need for a shared alternative vision that can channel dispersed rivulets of resistance into a creative, tumultuous flow.

In short, an alternative, transformational approach to development would involve both ways of *thinking* about things and ways of *acting* on them. In the present context it would concern both how gender relations and relations between people and the non-human world are conceptualized, and how they are concretized in terms of the distribution of property, power, and knowledge, and in the formulation of development policies and programs.

It is in its failure to explicitly confront these political economy issues that the ecofeminist analysis remains a critique without threat to the established order.

NOTES

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1. See especially Ynestra King, "Feminism and the Revolt," *Heresies,* no. 13, "Special Issue on Feminism and Ecology" (1981): 12-16, "The Ecology of Feminism and the Feminism of Ecology," in *Healing the Wounds: The Promise of Ecofeminism,* ed. Judith Plant (Philadelphia: New Society Publishers, 1989), 18-28, "Healing the Wounds: Feminism, Ecology, and the Nature/Culture Dualism," in *Reweaving the World: The Emergence of Ecofeminism,* ed. Irene Diamond and Gloria Orenstein (San Francisco: Sierra Club Books, 1990), 98-112; Ariel Kay Salleh, "Deeper Than Deep Ecology: The Eco-Feminist Connection," *Environmental Ethics* 16 (Winter 1984): 339-45; Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution* (San Francisco: Harper & Row, 1980); and Susan Griffin, *Women and Nature: The Roaring within Her* (New York: Harper & Row, 1978). Also see discussions and critiques by Michael E. Zimmerman, "Feminism, Deep Ecology, and Environmental Ethics" (pp. 21-44) and Karen J. Warren, "Feminism and Ecology: Making Connections" (pp. 3-20), both in *Environmental Ethics* 9

(Spring 1987); Jim Cheney, "Ecofeminism and Deep Ecology," *Environmental Ethics* 9 (Summer 1987): 115-45; and Helen E. Longino's review of Merchant in *Environmental Ethics* 3 (Winter 1981): 365-69.
2. King, "Ecology of Feminism," 18.
3. Sherry Ortner, "Is Male to Female As Nature Is to Culture?" in *Women, Culture, and Society,* ed. Michelle Z. Rosaldo and Louise Lamphere (Stanford: Stanford University Press, 1974), quotes on pp. 72, 73.
4. See the case studies, and especially Carol P. MacCormack's introductory essay in *Nature, Culture, and Gender,* ed. Carol P. MacCormack and Marilyn Strathern (Cambridge: Cambridge University Press, 1980), 13. Also see Henrietta L. Moore, *Feminism and Anthropology* (Minneapolis: University of Minnesota Press, 1989).
5. Salleh, 340.
6. See Merchant, 144.
7. Ibid., 2, 3.
8. For this and the previous quote see ibid., xx-xxi, xix.
9. King in "Feminism and the Revolt" (unlike in her earlier work) does mention the necessity of such a differentiation but does not discuss how a recognition of this difference would affect her basic analysis.
10. For an illuminating discussion of the debate on essentialism and constructionism within feminist theory, see Diane Fuss, *Essentially Speaking* (New York: Routledge, 1989).
11. See case studies in *Nature, Culture, and Gender.*
12. Vandana Shiva, *Staying Alive: Women, Ecology, and Survival* (London: Zed Books, 1988), quotes on pp. 39, 42.
13. Ibid., 14-15.
14. Also see the discussion by Gabrielle Dietrich, "Plea for Survival: Book Review," *Economic and Political Weekly,* 18 Feb. 1989, 353-54. Apart from the religion-specificity of the discourse on the feminine principle, an interesting example of the relationship between different religious traditions and the environment is that of sacred groves. These groves, dedicated to local deities and sometimes spread over 100 acres, were traditionally preserved by local Hindu and tribal communities and could be found in several parts of the country. Entry into them was severely restricted and tree cutting usually forbidden. (See Madhav Gadgil and V.D. Vartak, "Sacred Groves of India: A Plea for Continued Conservation," *Journal of the Bombay Natural History Society* 72, no. 2 [1975].) These groves are now disappearing. Among the Khasi tribe of northeast India, elderly non-Christian Khasis I spoke to identify the main cause of this destruction to be the large-scale conversion of Khasis to Christianity which undermined traditional beliefs in deities and so removed the main obstacle to the exploitation of these groves for personal gain.
15. For instance, the Rig-Veda, the collection of sacred Sanskirt hymns preserved orally for over 3,000 years, which constitutes the roots of Brahmanic Hinduism, is said to have been traditionally inaccessible to women and untouchable castes, both of whom were forbidden to recite the hymns on the ground that they would defile the magic power of the words (for elaboration see Wendy O. Flaherty's *Other People's Myths* [New York and London: Macmillan, 1990]). In contrast, the *Bhakti* movement, which began around the sixth century, sought to establish a direct relationship between God and the individual (without the mediation of Brahmin priests) irrespective of sex or caste and gave rise to numerous devotional songs and poems in the vernacular languages. Many women are associated with the movement, one of the best-known being the sixteenth-century poet-saint, Mirabai. Today the *Bhakti* tradition coexists with the more ritualistic and rigid Brahmanic tradition. In fact a significant dimension of the growing Hindu fundamentalism in India in recent years is precisely the attempt by some to give promi-

nence to one interpretation of Hinduism over others—a visible, contemporary struggle over meanings.

Similarly, several versions of the great epic, *Ramayana* have existed historically, including versions where the central female character, Sita, displays none of the subservience to her husband that is emphasized in the popular version (treated as sacred text) and which has molded the image of the ideal Indian woman in the modern mass media. Feminist resistance to such gender constructions has taken various forms, including challenging popular interpretations of female characters in the epics and drawing attention to alternative interpretations. See for instance, Uma Chakravarty's essay "The Sita Myth," *Samya Shakti* 1 (July 1983); and Bina Agarwal's poem, "Sita Speak," *Indian Express,* 17 Nov. 1985.

16. See Irfan Habib, "Peasant and Artisan Resistance in Mughal India," *McGill Studies in International Development* no. 34 (McGill University, Center for Developing Area Studies, 1984), and his essay in *Cambridge Economic History of India,* ed. Tapan Ray Chaudhuri and Irfan Habib (Cambridge: Cambridge University Press, 1982).

17. See especially Kerala Forestry Research Institute, *Studies in the Changing Patterns of Man-Forest Interaction and Its Implications for Ecology and Management* (Trivandrum, 1980), 235.

18. It is estimated that in 1981-82, 66.6 percent of landowning households in rural India owned 1 hectare or less and accounted for only 12.2 percent of all land owned by rural households (National Sample Survey Organisation, *Thirty-seventh Round Report on Land Holdings—I, Some Aspects of Household Ownership Holdings* (Department of Statistics, Government of India, 1987). The distribution of operational holdings is almost as skewed.

19. See N.S. Jodha, "Common Property Resources and Rural Poor," *Economic and Political Weekly,* 5 July 1986, 1169-81; and Piers Blaikie, *The Political Economy of Soil Erosion in Developing Countries* (London and New York: Longman, 1985).

20. Sharad Kulkarni, "Towards a Social Forestry Policy," *Economic and Political Weekly,* 5 Feb. 1983, 191-96.

21. See V. Pingle, "Some Studies of Two Tribal Groups of Central India, pt. 2: The Importance of Food Consumed in Two Different Seasons," *Plant Food for Man* 1 (1975); and Bina Agarwal, "Social Security and the Family: Coping with Seasonality and Calamity in Rural India," *Journal of Peasant Studies* 17 (April 1990): 341-412.

22. I prefer to use the term "control rights" here, rather than the commonly used term "property rights," because what appears critical in this context is less who owns the resources than who has control over them. Hence, for instance, the control of state-owned resources could effectively rest with the village community.

23. *Forest Survey of India* (New Delhi: Ministry of Environment and Forests, Government of India, 1990).

24. P.K. Joshi and A.K. Agnihotri, "An Assessment of the Adverse Effects of Canal Irrigation in India," *Indian Journal of Agricultural Economics* 39 (July-September 1984): 528-36.

25. See, for instance, Jayanta Bandyopadhyay, "A Case Study of Environmental Degradation in Karnataka." (Paper presented at a workshop on Drought and Desertification, India International Center, 17-18 May 1986); and B.D. Dhawan, *Development of Tubewell Irrigation in India* (Delhi: Agricole Publishing Academy, 1982).

26. Center for Science and Environment, *The State of India's Environment: A Citizen's Report, 1985-86* (Delhi: Center for Science and Environment, 1986).

27. See especially, Ramachandra Guha, "Forestry in British and Post-British India: A Historical Analysis," *Economic and Political Weekly,* 29 Oct. 1983, 1882-96.

28. See Malini Chand and Rita Bezboruah, "Employment Opportunities for Women in Forestry," in *Community Forestry and People's Participation—Seminar Report* (Ranchi Con-

sortium for Community Forestry, 20-22 Nov. 1980); and Srilata Swaminathan, "Environment: Tree versus Man," *India International Center Quarterly* 9, nos. 3 and 4 (1982).
29. However, the degree to which the village community acted as a cohesive group and the extent of control it exercised over communal lands varied across undivided India: it was much greater in the northwest than elsewhere (see B.H. Baden-Powell, *The Indian Village Community* [New Haven, Conn.: HRAF Press, 1957]).
30. For a detailed discussion on these causes, see Jodha.
31. Bandyopadhyay.
32. On traditional systems of community water management see Nirmal Sengupta, "Irrigation: Traditional vs. Modern," *Economic and Political Weekly,* Special Number (November 1985): 1919-38; Edmund R. Leach, *Pul Eliya—A Village in Ceylon: A Study of Land Tenure and Kinship* (Cambridge: Cambridge University Press, 1967); and David Seklar, "The New Era of Irrigation Management in India" (photocopy, Ford Foundation, Delhi, 1981). On communal management of forests and village commons, see Ramachandra Guha, "Scientific Forestry and Social Change in Uttarakhand" (pp. 1939-52), and Madhav Gadgil, "Towards an Ecological History of India" (pp. 1909-38), both in *Economic and Political Weekly,* Special Number (November 1985); and M. Moench, "Turf and Forest Management in a Garhwal Hill Village," in *Whose Trees? Proprietary Dimensions of Forestry,* ed. Louise Fortmann and John W. Bruce (Boulder, Colo.: Westview Press, 1988). On firewood gathering practices, see Bina Agarwal, "Under the Cooking Pot: The Political Economy of the Domestic Fuel Crisis in Rural South Asia," *IDS Bulletin* 18, no. 1 (1987): 11-22. Firewood for domestic use in rural households was customarily collected in the form of twigs and fallen branches, which did not destroy the trees. Even today, 75 percent of firewood used as domestic fuel in northern India (and 100 percent in some other areas) is in this form.
33. The preservation of sacred groves described in note 14 is one such example.
34. Also see discussion in Partha Dasgupta and Karl-Goran Maler, "The Environment and Emerging Development Issues." (Paper presented at a conference on Environment and Development, Wider, Helsinki, September 1990).
35. Daniel W. Bromley and Michael M. Cernea, "The Management of Common Property Natural Resources," *World Bank Discussion Paper* no. 57 (Washington, D.C.: World Bank, 1989), 25.
36. Ibid.
37. Paul Shaw, "Population, Environment, and Women: An Analytical Framework." (Paper prepared for the United Nations Fund for Population Activities [UNFPA], Inter-Agency Consultative Meeting, New York, 6 Mar. 1989), 7.
38. Mark Rosenzweig and Kenneth I. Wolpin, "Specific Experience, Household Structure, and Intergenerational Transfers: Farm Family Land and Labor Arrangements in Developing Countries," *Quarterly Journal of Economics* 100, supp. (1985): 961-87.
39. Under some large-scale irrigation works, crop yields are *lower* than in the period immediately prior to the project (Joshi and Agnihotri).
40. C.H. Hanumantha Rao, S.K. Ray, and K. Subbarao, *Unstable Agriculture and Drought* (Delhi: Vikas Publishing, 1988).
41. Bernhard Glaeser, ed. *Learning From China? Development and Environment in Third World Countries* (London: Allen & Unwin, 1987).
42. Also see Stephen A. Marglin, "Losing Touch: The Cultural Conditions of Worker Accommodation and Resistance," in *Knowledge and Power,* ed. Frederique A. Marglin and Stephen A. Marglin (Oxford: Oxford University Press, 1988).
43. See Bruce F. Johnston, "The Japanese Model of Agricultural Development: Its Relevance to Developing Nations," in *Agriculture and Economic Growth—Japan's Experience,* ed. Kazushi Ohkawa, Bruce F. Johnston, and Hiromitsu Kaneda (Princeton: Princeton University Press, 1969), 61.

44. For a review of issues and literature on this question, see Bina Agarwal, "Women, Poverty, and Agricultural Growth in India," *Journal of Peasant Studies* 13 (July 1986): 165-220.
45. These sex ratios are particularly female-adverse in the agriculturally prosperous northwestern regions of Punjab and Haryana where these figures are, respectively, 88 and 87 females per 100 males. For a discussion on the causes of this regional variation see Agarwal, "Women, Poverty, and Agricultural Growth in India" and Barbara Miller, *The Endangered Sex: Neglect of Female Children in North-West India* (Ithaca: Cornell University Press, 1981).
46. Women in India rarely own land, and in most areas also have limited access to personal assets such as cash and jewelry. See Bina Agarwal, "Who Sows? Who Reaps? Women and Land Rights in India," *Journal of Peasant Studies* 15 (July 1988): 531-81.
47. See discussions in Agarwal, "Women, Poverty, and Agricultural Growth in India"; Bina Agarwal, "Rural Women and the High Yielding Variety Rice Technology in India," *Economic and Political Weekly,* 31 Mar. 1984, A39-A52; and Kalpana Bardhan, "Rural Employment, Welfare, and Status: Forces of Tradition and Change in India," *Economic and Political Weekly,* 25 June 1977, A34-A48; 2 July 1977, 1062-74; 9 July 1977, 1101-18.
48. See Agarwal, "Rural Women and the High Yielding Variety Rice Technology"; and James G. Ryan and R.D. Ghodake, "Labour Market Behaviour in Rural Villages in South India: Effects of Season, Sex, and Socio-Economic Status," Progress Report, Economic Programme 14, International Crop Research Institute for Semi-Arid Tropics (ICRISAT), Hyderbad (1980).
49. See Bina Agarwal, "Women, Land, and Ideology in India," in *Women, Poverty, and Ideology: Contradictory Pressures, Uneasy Resolutions,* ed. Haleh Afshar and Bina Agarwal (London: Macmillan, 1989); and Ursula Sharma, *Women, Work, and Property in North-West India* (London: Tavistock, 1980).
50. For a detailed cross-regional mapping of some of these variables in the context of women's land rights in South Asia, see Bina Agarwal, *Who Sows? Who Reaps? Gender and Land Rights in South Asia,* forthcoming (Cambridge: Cambridge University Press).
51. Quoted in Sundarlal Bahuguna, "Women's Non-violent Power in the Chipko Movement," in *In Search of Answers: Indian Women's Voices in "Manushi,"* ed. Madhu Kishwar and Ruth Vanita (London: Zed Books, 1984), 132.
52. Personal communication, Chitra Sundaram, Danish International Development Agency (DANIDA), Delhi, 1981.
53. Bina Agarwal, "Women and Water Resource Development," photocopy, Institute of Economic Growth, Delhi, 1981.
54. Bahuguna.
55. Shubh Kumar and David Hotchkiss, "Consequences of Deforestation for Women's Time Allocation, Agricultural Production, and Nutrition in Hill Areas of Nepal," *Research Report* 69 (Washington, D.C.: International Food Policy Research Institute, 1988).
56. See T. Bhaduri and V. Surin, "Community Forestry and Women Headloaders," in *Community Forestry and People's Participation Seminar Report* (Ranchi Consortium for Community Forestry, 20-22 Nov. 1980).
57. Michael Howes and M.A. Jabbar, "Rural Fuel Shortages in Bangladesh: The Evidence from Four Villages," *Discussion Paper* 213 (Sussex, England: Institute of Development Studies, 1986).
58. Agarwal, "Women and Water Resource Development."
59. Joan P. Mencher and K. Saradamoni, "Muddy Feet and Dirty Hands: Rice Production and Female Agricultural Labour," *Economic and Political Weekly,* 25 Dec. 1982, A149-A167; and United Nations Development Program, Rural Women's Participation in Development, *Evaluation Study,* no. 3, UNDP, New York (June 1979).

60. Rudolf G. Wagner, "Agriculture and Environmental Protection in China," in *Learning from China?*
61. Dinesh Mohan, "Food vs Limbs: Pesticides and Physical Disability in India," *Economic and Political Weekly,* 28 Mar. 1987, A23-A29.
62. These are apart from the widely documented patron-client types of relationships.
63. See Sharma, *Women, Work, and Property in North-West India;* and Sylvia Vatuk, "Sharing, Giving, and Exchanging of Foods in South Asian Societies," (University of Illinois at Chicago Circle, October 1981).
64. See Amartya Sen, "Gender and Cooperative-Conflict," in *Persistent Inequalities,* ed. Irene Tinker (New York: Oxford University Press, 1990) for a discussion on the bargaining approach to conceptualizing intrahousehold gender relations, and Agarwal, "Social Security and the Family," for a discussion on the factors that affect intrahousehold bargaining power.
65. Walter Fernandes and Geeta Menon, *Tribal Women and Forest Economy: Deforestation, Exploitation, and Status Change* (Delhi: Indian Social Institute, 1987), 115.
66. Among the Garo tribals of northeast India in the early 1960s, Burling found that the men always deferred on this count to the women, who knew of approximately 300 indigenously cultivated rice varieties. See Robbins Burling, *Rensanggri: Family and Kinship in a Garo Village* (Philadelphia: Pennsylvania University Press, 1963). In Nepal even today it is women who do the seed selection work among virtually all communities. See Meena Acharya and Lynn Bennett, "Women and the Subsistence Sector in Nepal," *World Bank Staff Working Paper* no. 526 (Washington, D.C.: World Bank, 1981).
67. For a detailed discussion on these schemes and their shortcomings, see Bina Agarwal, *Cold Hearths and Barren Slopes: The Woodfuel Crisis in the Third World* (London: Zed Books, 1986).
68. D.M. Chandrashekar, B.V. Krishna Murti, and S.R. Ramaswamy, "Social Forestry in Karnataka: An Impact Analysis," *Economic and Political Weekly,* 13 June 1987, 935-41; and Shiva.
69. Vandana Shiva, "Ecology Movements in India," *Alternatives* 11 (1987): 255-73.
70. Ramachandra Guha, "Ideological Trends in Indian Environmentalism," *Economic and Political Weekly,* 3 Dec. 1988, 2578-81.
71. Among the many writings on the Chipko movement, see especially Jayanta Bandyopadhyay and Vandana Shiva, "Chipko," *Seminar,* no. 330 (February 1987); Shiva; Shobhita Jain, "Women and People's Ecological Movement: A Case Study of Women's Role in the Chipko Movement in Uttar Pradesh," *Economic and Political Weekly,* 13 Oct. 1984, 1788-94; and Bharat Dogra, *Forests and People,* published by the author (Delhi, 1984).
72. I understand there have also been cases of people hugging trees to protect them from loggers in the United States, although they appear to have no apparent link with Chipko.
73. There is a growing literature indicating significant gender differences in cash-spending patterns, with a considerable percentage (at times up to 40 percent) of what men earn in poor rural households often going toward the purchase of items they alone consume, such as liquor, tobacco, and clothes, and much of what the women earn going toward the family's basic needs. See especially Joan Mencher, "Women's Work and Poverty: Women's Contribution to Household Maintenance in Two Regions of South India," in *A Home Divided: Women and Income in the Third World,* ed. Daisy Dwyer and Judith Bruce (Stanford: Stanford University Press, 1988).
74. This gender divergence has also been noted elsewhere. See Rita Brara, "Commons Policy As Process: The Case of Rajasthan, 1955-85," *Economic and Political Weekly,* 7 Oct. 1987, 2247-54.
75. Quoted in Shiva.
76. For a critique of these lines of argument, see Helen E. Longino, "Can There Be a Feminist Science?" *Hypatia* 2 (Fall 1987): 51-64.